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While the preferred embodiment of the invention has been illustrated and described, it will be appreciated that various changes can be made therein without departing from the spirit and scope of the invention.

We claim:

1. A method for detecting the presence or amount of a eubacteria in a biological sample comprising the steps of:

collecting the biological sample;

incubating an aliquot of the biological sample with a murein binding polypeptide under conditions suitable for binding of the murein binding polypeptide to the eubacteria;

detecting the bound murein binding polypeptide thereby detecting the presence or amount of the eubacteria in the biological sample,

wherein said murein binding polypeptide comprises a catalytically inactive enzyme capable of binding but not cleaving a peptidoglycan comprising NAc-muramic acid in said eubacteria.

2. The method of claim **1**, wherein said murein binding polypeptide is conjugation to a signal generating compound wherein said murein binding polypeptide is conjugated to a signal generating compound.

3. The method of claim **2**, wherein said signal generating compound is selected from the group consisting of an enzyme, a fluorophore, a phycobilin, a biotin, an avidin, a streptavidin, a bioluminescent compound, a chemiluminescent compound, a histochemical dye, a magnetic particle and a radioactive compound.

4. The method of claim **3**, wherein said second generating enzyme is selected from the group consisting of a horse radish peroxidase, an alkaline phosphatase, a glucose oxidase, a catalase, a glucuronidase and a urease.

5. The method of claim **3**, wherein said fluorophore is selected from the group consisting of a succinyl fluorescein, a fluorescein isothiocyanate, a rhodamine and a lissamine.

6. The method of claim **2**, wherein said catalytically inactive enzyme polypeptide has a binding site capable of binding to said peptidoglycan with a binding affinity of about 5×10^{-7} L/mol to about 5×10^{-9} L/mol and wherein said conjugate is effective when bound to said eubacteria to produce a detectable signal in a diagnostic assay format.

7. The method of claim **2**, wherein said signal generating compound is selected from the group consisting of an enzyme, a fluorophore, a phycobilin, a biotin, an avidin, a streptavidin, a bioluminescent compound, a chemiluminescent compound, a hitochemical dye and a radio labeled compound.

8. The method of claim **7**, wherein said signal genetic enzyme is selected from the group consisting of a horse radish peroxidase, an alkaline phosphatase, a glucose oxidase, a catalase, a glucuronidase and a urease.

9. The method of claim **1**, wherein said incubating step suitable conditions comprise the addition of an additive selected from the group consisting of a stabilizer, a buffer, an emulsifier, an agent inactivating a catalytically active enzyme to produce said catalytically inactive enzyme and an agent for promoting interactions between said murein binding polypeptide and said murein.

10. The method of claim **9**, wherein said catalytically inactive enzyme is selected from consisting of a mutant enzyme, a recombinant-enzyme, a chemically inactivated enzyme and an enzyme polypeptide fragment.

11. The method of claim **1**, further comprising a chemical alkaline hydrolysis of the collected biological sample effective to hydrolyze a peptide bond in said eubacterial peptidoglycan before the incubation of the collected biological sample with the murein binding protein.

12. The method of claim **11**, wherein said conditions suitable for binding of the murein binding polypeptide to the eubacteria comprise a fluid phase.

13. The method of claim **12**, wherein said fluid phase comprises a cytometric fluid and said method for detecting comprises a cytometric method.

14. The method of claim **11**, wherein said chemical alkaline hydrolysis comprises incubating the biological sample in a chemical base at a pH of greater than about 8, at a temperature of about 22° C. to about 70° C. for about 10 minutes to about 30 minutes.

15. The method of claim **14**, wherein said chemical base is selected from the group consisting of sodium hydroxide, potassium hydroxide, ammonium hydroxide, barium hydroxide, calcium hydroxide, potassium carbonate, sodium carbonate, potassium acetate and sodium barbital.

16. The method of claim **15**, further comprising a chemical acetylation step after said neutralization step and before said incubation step, wherein said chemical acetylation step is effective to N-acetylate a eubacterial sugar residue in a eubacterial cell wall.

17. The method of claim **16**, further wherein said chemical acetylation step comprises adding an acetylation reagent and incubating said checically biological sample for about 2 minutes to about 10 minutes at about 22° C.

18. The method of claim **19**, wherein said acetylation reagent comprises acetic anhydride or acetic chloride.

19. The method of claim **11**, wherein said collected biological sample is brought to about chemical neutrality after said chemical alkaline hydrolysis step and before said incubating step.

20. The method of claim **1**, wherein said catalytically inactive enzyme is selected from the group consisting of an acetyl-muramoyl-D,L- alanyl amidase, a bacterial cell wall enzyme binding penicillin, an alanyl D,D- or D,L-endopeptidase, a D,D- or D,L-carboxypeptidase, a transglycosyl transferase, a peptidyl transferase, a muramoyl isomerase, a muramoyl transglycosylase, a murein autolysin, a murein hydrolase and a lysozyme.